EXHIBIT 23

Expert Report

Angela L. Rasmussen, Ph.D.

November 6, 2020

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I. Expert Report

A. Scope of Retention and Compensation

I was engaged by Hunton Andrews Kurth in the matter Treasure Island LLC v. Affiliated FM Insurance Company, which is currently pending in Federal Court in Nevada. I was asked to give opinions within my area of expertise, virology, on the following topics: (1) whether (and if so, how) persons on-site with COVID-19 impact the property at Treasure Island; (2) if yes, whether the impact is "temporary"; (3) the purpose of the Orders; (4) the purpose of the ongoing personal protective equipment, administrative controls, and engineering controls; and (5) whether certain policy provisions can be reconciled with the science of a communicable disease. I am being compensated $500/hour for my work on this report and for deposition and trial testimony and $300/hour for travel time.

As part of my analysis, I have reviewed the complaint filed by Counsel on behalf of Treasure Island and the relevant policy issued by AFM, relevant orders by the Governor, Gaming Control Board, and public health officials in the state of Nevada, and data on testing and cases on Treasure Island guests and employees. I have also conducted an extensive literature review concerning transmission, virology, and epidemiology of SARS-CoV-2. Finally, I reviewed public health agency guidance, including CDC guidance regarding the opening and operation of gaming businesses, and CDC and WHO general guidance on SARS-CoV-2 risk reduction. A full list of documents considered is included in Section II, Exhibit C. My evaluation is based on my own education and experience as a virologist specializing in emerging viral pathogens, including SARS-CoV-2, as well as the current evidence-based understanding in my field of SARS-CoV-2 biology with regard to environmental persistence, transmission, virulence, and pathogenesis of COVID-19.

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B. Summary of Qualifications

I am an Associate Research Scientist at the Center for Infection and Immunity at the Columbia Mailman School of Public Health, as well as a Principal Investigator with the Viral Emergence Research Consortium (Verena) at the Georgetown Center for Global Health Science and Security. I study the host response to infection with emerging viral pathogens of significant concern to global public health including avian influenza, Ebola virus, MERS-CoV, and SARS-CoV-2. My particular area of expertise is combining classical virology techniques with modern systems biology approaches to study critical problems in understanding and developing countermeasures for novel emerging viral pathogens. I have extensive experience integrating data from experimental systems, including in vitro and animal models of infection and disease, and clinical settings.

I have studied human viral pathogens since 2003 and have over 30 peer-reviewed publications in this area, including 4 publications on SARS-CoV-2, with an additional 2 manuscripts currently undergoing peer review. My work on emerging pathogens has been published in top tier journals including *Science*, *Nature Medicine*, *Cell*, *the Proceedings of the*

National Academy of Sciences, and the *New England Journal of Medicine*. I have also presented my work at a number of conferences and seminars. I currently sit on the editorial board for two specialty journals, *Cell Reports* and *mSphere*. Previously I have served as a guest editor for *Frontiers in Cellular and Infection Microbiology, Vaccines*, and *Viruses*. My work has been funded by the National Institutes of Health (NIH), the National Science Foundation, the Defense Advanced Research Projects Agency, and the Defense Threat Reduction Agency. I have also served on study sections for NIH, the National Aeronautics and Space Administration, the Department of Defense, and several private foundations' funding programs.

In addition, I have written numerous general interest pieces on viral infection and transmission for *Forbes*, *Slate*, *Leapsmag*, and *Foreign Affairs*, and been interviewed and quoted multiple times in print, radio, and broadcast media, including the *New York Times*, the *Washington Post*, the Associated Press, Reuters, National Public Radio, ABC, NBC, CBS, PBS, Fox, CBC, and BBC. I have also been engaged as a consultant and scientific advisor for a wide range of clients, including marketing, investment, and medical or scientific educational firms. I have over 175,000 Twitter followers on my verified account and am widely regarded as an expert researcher and communicator regarding the biology of emerging zoonotic viruses, including SARS-CoV-2. My curriculum vitae is included in Section II, Exhibit B.

C. Summary of Opinions

I have evaluated the facts in this case in the context of this matter and my experience with evaluating the pathogenic properties of emergent epidemic and pandemic viruses, as well as my professional background as a virologist studying novel coronaviruses. The opinions expressed herein are based on my knowledge, skill, training, education and materials considered (identified herein). It is my professional opinion to a reasonable degree of scientific certainty:

1. COVID-19 is a communicable disease that impacts and physically damages Treasure Island's property in the following way: persons on site with COVID-19 shed the SARS-CoV-2 virus into the air and surfaces at Treasure Island. This results in tangible, demonstrable, and detectable physical alteration and transformation to the air and surfaces and rendering them dangerous transmission vehicles for the potentially deadly disease.

2. The impact and physical damage caused by persons with COVID-19 is not temporary and is sustained through any occupation of the property. Because COVID-19 is an infectious viral disease that can be transmitted to susceptible people, it causes additive, sustained property damage. A substantial amount of transmission is prior to onset of clinical symptoms, which makes it difficult to detect. Due to the size of the property at Treasure Island, cleaning and disinfection alone are insufficient to remediate the damage.

3. The Nevada governor's order to close was to address the impact and physical damage caused by persons with COVID-19 on site.

4. The purpose of re-opening with personal protective equipment, administrative controls, and engineering controls is to attempt to mitigate and control the impact and physical damage caused by persons with COVID-19 on site.

5. Certain provisions in the policy are in direct conflict with the science of communicable disease. As written, the policy attempts to provide coverage for communicable disease while excluding coverage for virus. As a matter of science and common understanding, these positions are irreconcilable since SARS-CoV-2 (virus) is the cause of COVID-19 (communicable disease), and the only tangible element of a communicable disease that could possibly be cleaned, removed or disposed of, is the virus that causes it.

D. Statement of Opinions and Basis for Opinions

1. COVID-19 is a communicable disease that impacts and physically damages Treasure Island's property in the following way: persons on site with the disease shed SARS-CoV-2 virus into the air and surfaces at Treasure Island.

i. SARS-CoV-2 is a novel emergent betacoronavirus that is the causative agent of COVID-19. Infected people shed copious amounts of SARS-CoV-2 into the physical environment around them[1–6] by several different mechanisms (Section II, Exhibit A, Figure 1). SARS-CoV-2 is exhaled through normal breathing into the air by persons with COVID-19, where it persists in respiratory aerosols and droplets. Small particle aerosols can remain suspended in the air for prolonged periods of time, where they can travel distances greater than 6 feet and eventually settle on surfaces to become fomites (infectious objects). SARS-CoV-2 can be deposited on surfaces either through direct contact with respiratory secretions or saliva of an infected person (transfer by hand or tissue) or by settling of aerosols and droplets from the air. In addition, "toilet plumes" generated by flushing toilets can cause large quantities of virus-containing fecal particles to be aerosolized. Fecal bioaerosols behave like respiratory aerosols and can likewise travel over distances greater than 6 feet through the air and settle on surfaces. SARS-CoV-2 in the air and on surfaces presents a substantial infection risk to persons occupying the property. Any time an infected person is present, this cycle of virus emission into the air and eventually settling on physical surfaces, and potentially infecting a new person, is repeated.

ii. SARS-CoV-2 can persist in indoor environments for long periods of time. On the Diamond Princess cruise ship, viral RNA was detected 17 days after passengers disembarked despite attention paid to surface disinfection[7,8] SARS-CoV-2 RNA has been detected on packages even after international transport, as well as on numerous environmental samples in locations where infected people have visited or shopped, such as markets, airplanes, ships, or event venues. Multiple studies demonstrate that SARS-CoV-2 shed by people with COVID-19 can remain infectious in both aerosols and on many different types of surfaces[9–12], and in some cases can remain infectious for weeks depending on ambient temperature and humidity conditions in the

environment[9] (Section II, Exhibit A, Figure 2). Furthermore, the presence of proteins, which are ubiquitous in the environment and in respiratory and skin secretions, significantly prolongs fomite infectivity, or the length of time in which fomites can be transmitted[10]. Low temperature, low humidity environments that are protected from sunlight or ultraviolet radiation are particularly conducive to retained infectivity[13,14], and as such air conditioned, indoor environments present a substantial risk for maintaining infectious SARS-CoV-2 in the air and on surfaces. Importantly, droplets and aerosols suspended in the air produced from speech will settle onto surfaces in the ambient environment and become potential fomites (Section II, Exhibit A, Figure 1). While particles produced by speech can themselves remain as indoor air contaminants for long periods of time[15], they can remain infectious for days or weeks after settling on surfaces in the environment[9]. Exhaled respiratory particles and fecal bioaerosols present a significant transmission risk even after they have settled and are no longer suspended in the air. Thus, SARS-CoV-2 in the air can cause substantial property damage, both of shared air within a property and the physical property itself. Based on the current evidence, it is clear that infectious SARS-CoV-2 can remain in the environment, in both the air and on surfaces, and pose a significant exposure risk on damaged property even if no infected individuals are present at the time. Treasure Island is a sprawling complex on over 20 acres that features multiple high-touch surfaces in gaming areas with thousands of slots and table games, retail spaces, restaurants, bars and lounges, recreational activities, meeting rooms, and hotel rooms. The air and all of the surfaces in these spaces, including floors, can be damaged by the presence of people with COVID-19.

iii. Based on evidence presented in 1.i. and 1.ii., I conclude that the presence of virus in the air and on surfaces results in tangible, demonstrable, and detectable physical damage, resulting in the transformation of air and surfaces on the property into dangerous vehicles for transmission of SARS-CoV-2, the causative agent of a potentially deadly disease, COVID-19.

2. The impact and damage caused by persons with COVID-19 is not temporary and is sustained through any occupation of the property.

i. Damage to property caused by persons with COVID-19 is not limited to the duration that virus from a single source remains infectious. Because virus in the air and on surfaces can infect others, and then those infected people will in turn shed virus and further damage the property. This recurrent cycle of transmission therefore results in sustained property damage. In the US, there are high levels of SARS-CoV-2 community transmission nationwide. Any occupation of the property at Treasure Island is likely to result in property damage due to the high probability of an infected person entering the premises. There have been confirmed cases of COVID-19 in both employees and guests prior to the governor's orders to close and after resuming operations in June, demonstrating the extremely high likelihood of sustained damage caused by infected persons on the property.

ii. One major reason why SARS-CoV-2 transmission risk is so difficult to mitigate is the fact that there is significant transmission by presymptomatic individuals, or infected people who have no clinical signs of illness. A study estimated that early in the outbreak, nearly half of all new cases in Wuhan, China were the result of "undocumented" cases, or those that were not identified because they were not producing symptoms and patients were unaware that they had been exposed or were infected[16]. Viral loads in respiratory secretions are highest 24-48 hours prior to symptom onset[17,18]. Ocular secretions such as tears have also been reported to contain virus[19,20]. As a result, community transmission has proven very difficult to control. Businesses are unable to screen for presymptomatic individuals capable of transmitting virus, as rapid testing is not widely available, insufficiently sensitive, and prone to both false positives and false negatives. Temperature screening will not detect presymptomatic individuals who do not have a fever. Due to inadequate testing capacity and limited SARS-CoV-2 surveillance in the United States, people in close contact with presymptomatic infected persons may be unaware that they have been exposed and thus not realize that they should quarantine rather than enter Treasure Island property as an employee or guest. Furthermore, studies have shown that asymptomatic or presymptomatic individuals can shed substantial amounts of virus into the surrounding physical environment[3]. Thus, businesses open to individuals from regions with ongoing community transmission will invariably be subject to substantial exposure risks from presymptomatic individuals who are not aware that they are infected, and this will result in inevitable damage to property air and surfaces. Property is impacted by droplets and aerosols shed by individuals who are not aware that they are infected. Exhaled respiratory particles, ocular secretions, and fecal bioaerosols in the air on a given property will transition from the air to the floor or surfaces, where they continue to present a substantial exposure risk. Infectious particles can be transferred to surfaces from the bodies of infected people shedding virus or the bodies of those with whom they have had physical contact. These subsequently present a significant risk of fomite exposure (Section II, Exhibit A, Figure 1). The extent and nature of presymptomatic viral shedding suggests that property damage through environmental exposure and persistence in the air, surfaces, and floors is inevitable for high-traffic venues, particularly those such as Treasure Island that attract a large number of visitors from other communities with high prevalence. Even in the absence of guests, employees required to maintain and disinfect the property can become infected and continue to expose the property to SARS-CoV-2, resulting in continuous, repeated damage of the property. This leads to additive, sustained property damage, as those who are infected as a result of exposure to damaged property can then shed virus themselves, further damaging the property and substantially increasing risk to all employees and guests at Treasure Island.

iii. Even with personal protective equipment, administrative controls, and engineering controls such as physical distancing, masks, and a disinfection regime, SARS-CoV-2 cannot be completely eliminated from the property even at reduced occupancy. Without extensive remediation attempts that are largely unfeasible, property damaged by pathogenic microorganisms including anthrax has resulted in secondary infection from exposure to the environment[21]. In health care settings, even with robust ventilation and

stringent surface disinfection protocols, hospital-acquired infections are common with a variety of common pathogens present on surfaces and in the air[22]. Because Treasure Island is an enormous property with millions of square feet of surfaces to disinfect and huge volumes of shared air, adequate cleaning and disinfection protocols would require substantial numbers of staff present on site. Since a subset of these staff will almost certainly include infected persons shedding virus that would further damage the property, complete cleaning and disinfection is impossible.

3. **The purpose of the Nevada governor's order to close was to address the impact and damage caused by persons with COVID-19 on site.** Orders to close non-essential businesses and stay home mitigate impact and damage by eliminating opportunities for community transmission. Stay-home orders substantially reduce occupancy and thus reduce damage in two ways: fewer people on site and decreased community transmission reduces the probability that a person with COVID-19 will be on the property, and virus that has damaged the property can be eliminated through cleaning, disinfection, ventilation, air filtration, and reduced infectivity over time. However, stay home orders are only effective as long as Treasure Island remains closed and community prevalence remains low. If community transmission increases and infected persons return to the property, damage will occur and will be sustained in the absence of further orders.

4. **The purpose of re-opening with personal protective equipment, administrative controls, and engineering controls is to attempt to mitigate and control the impact and damage caused by persons with COVID-19 on site.** Long-term closure is not feasible for any business, and thus re-opening with personal protective equipment, administrative controls, and engineering controls in place to reduce exposure risk on the property is another means of mitigating and controlling damage caused by persons with COVID-19 to Treasure Island's property. As a result, Treasure Island has re-opened while applying these measures as recommended by federal and state public health authorities. However, personal protective equipment, administrative controls, and engineering controls are limited in their capacity to mitigate damage to Treasure Island property. Transmission risks are particularly high in indoor spaces, where the accumulation of infectious particles in the air renders physical distancing ineffective. This has been demonstrated experimentally in animal models[23,24], as well as shown by epidemiological evidence including transmission on buses[25], airplanes[26,27], restaurants[28], offices[29,30], choir practices[31], boats and ships[7,8,32], summer camps[33], hospitals and care facilities[34,35], and exercise facilities[36]. Furthermore, studies with experimentally generated aerosols[11,12,37], as well as virus cultured from air samples in hospital rooms with COVID-19 patients[38], have demonstrated that infectious virus can persist in the air, even in the presence of robust hospital ventilation and air filtration systems. In regions with high levels of transmission or where people congregate, any crowded indoor environment is inherently unsafe and presents a high exposure risk that cannot be fully mitigated with precautions like ventilation, masks, physical distancing, and surface disinfection. Large surges in positive cases have resulted from reopening indoor dining, bars, gyms, and casinos, underscoring the difficulty in effectively mitigating transmission risk, particularly in indoor settings.

The CDC has identified casinos as high risk locations for transmission and have issued

guidance specifically for this environment. Per these guidelines, the only low risk casino setting is fully virtual gaming, consistent with the notion that close contact or aerosol transmission risks cannot be fully mitigated regardless of physical distancing, masking, ventilation, or surface disinfection precautions[39]. However, it is not possible for Treasure Island to implement fully virtual gaming without incurring catastrophic losses, and it is impossible to justify doing so in light of government orders permitting casinos to operate with personal protective equipment, administrative controls, and engineering controls in place. Even if Treasure Island was able to incur such a loss, employees would still be required to be on the premises to maintain a property of this size and complexity, and thus is it is not possible to completely eliminate occupancy. Essentially the property will be damaged by exposure to SARS-CoV-2 even with severely reduced occupancy, or it will be damaged by neglect. There is no way to prevent significant property exposure with fully implemented non-pharmaceutical interventions with any type of in-person gaming or work on the premises.

5. **Certain provisions in the policy are in direct conflict with the science of communicable disease. As written, the policy attempts to provide coverage for communicable disease while excluding coverage for virus. As a matter of science and common understanding, these positions are irreconcilable since SARS-CoV-2 (virus) is the cause of COVID-19 (communicable disease), and the only tangible element of a communicable disease that could possibly be cleaned, removed or disposed of, is the virus that causes it.** The policy defines communicable disease as disease which is: 1. Transmissible from human to human by direct or indirect contact with an affected individual or the individual's discharges, or 2. Legionellosis (TI1134). A communicable disease is defined in the science of infectious disease as a pathological condition caused by infection with a pathogen that is transmissible to a human by direct or indirect contact with an infected person, animal, or fomite, or consumption of contaminated food or water. From my perspective as a virologist, COVID-19 is a disease caused by SARS-CoV-2, a viral pathogen that is transmitted via direct or indirect contact with an infected person or fomite, and thus meets this definition.

   The policy contains affirmative coverage for communicable disease, which includes, among other things, the physical presence of disease (TI1099). However, a disease does not have a physical presence. A disease is a condition caused by a viral pathogen with a physical presence, in this case, SARS-CoV-2. The communicable disease coverage, as written, pertains to the etiologic agent of the disease, which does have a physical presence. In this case, the disease is COVID-19 and the virus which causes it is SARS-CoV-2. To have meaning, the communicable disease coverage, therefore, is actually virus coverage and applies to damage caused by SARS-CoV-2.

   However, the policy contains an exclusion for contamination (TI1097). The policy defines contamination as "any condition of property due to the actual or suspected presence of any foreign substance, impurity, pollutant, hazardous material, poison, toxin, pathogen or pathogenic organism, bacteria, virus, disease-causing or illness-causing agent, fungus, mold or mildew" (TI1134). This directly contradicts the affirmative coverage for

communicable disease, which unequivocally includes diseases caused by viral pathogens such as SARS-CoV-2.

From my perspective as a virologist, therefore, the only reasonable way to interpret the policy's communicable disease coverage is to read that coverage applies specifically to SARS-CoV-2, the causative agent of COVID-19, and other transmissible pathogens.

Because SARS-CoV-2 is a novel virus unknown prior to December 30, 2019, the science is constantly evolving. SARS-CoV-2 is fundamentally different than previous emergent betacoronaviruses including SARS-CoV and MERS-CoV, with unique properties concerning its biology, replication, pathogenesis, and transmissibility. I reserve the right to supplement or amend my opinion as new data emerges and/or I am provided with additional documents or data.

II. Exhibits

A. Supporting Analyses

Figure 1. The Cycle of Property Damage by Persons with COVID-19 in Air and On Surfaces

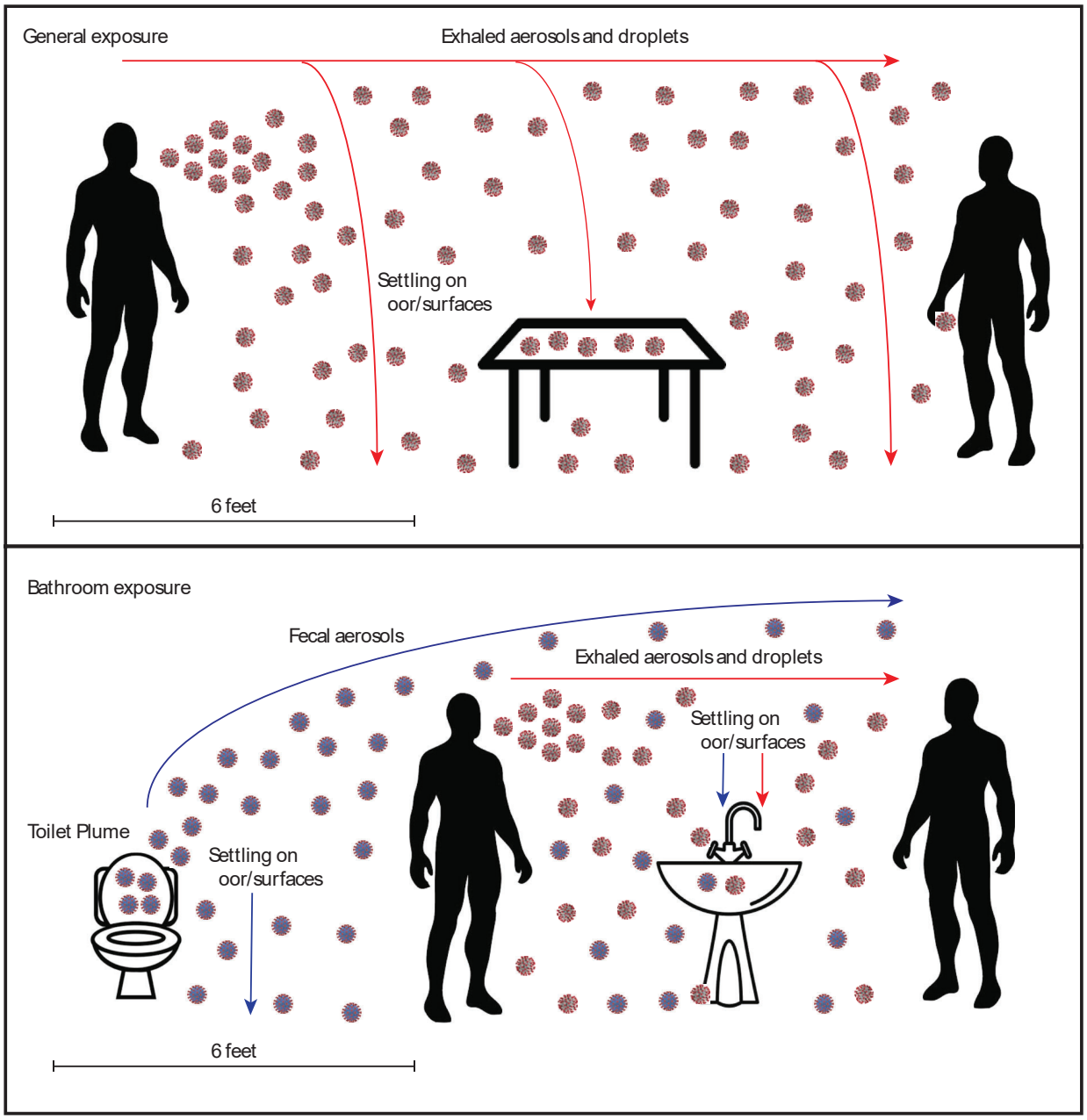
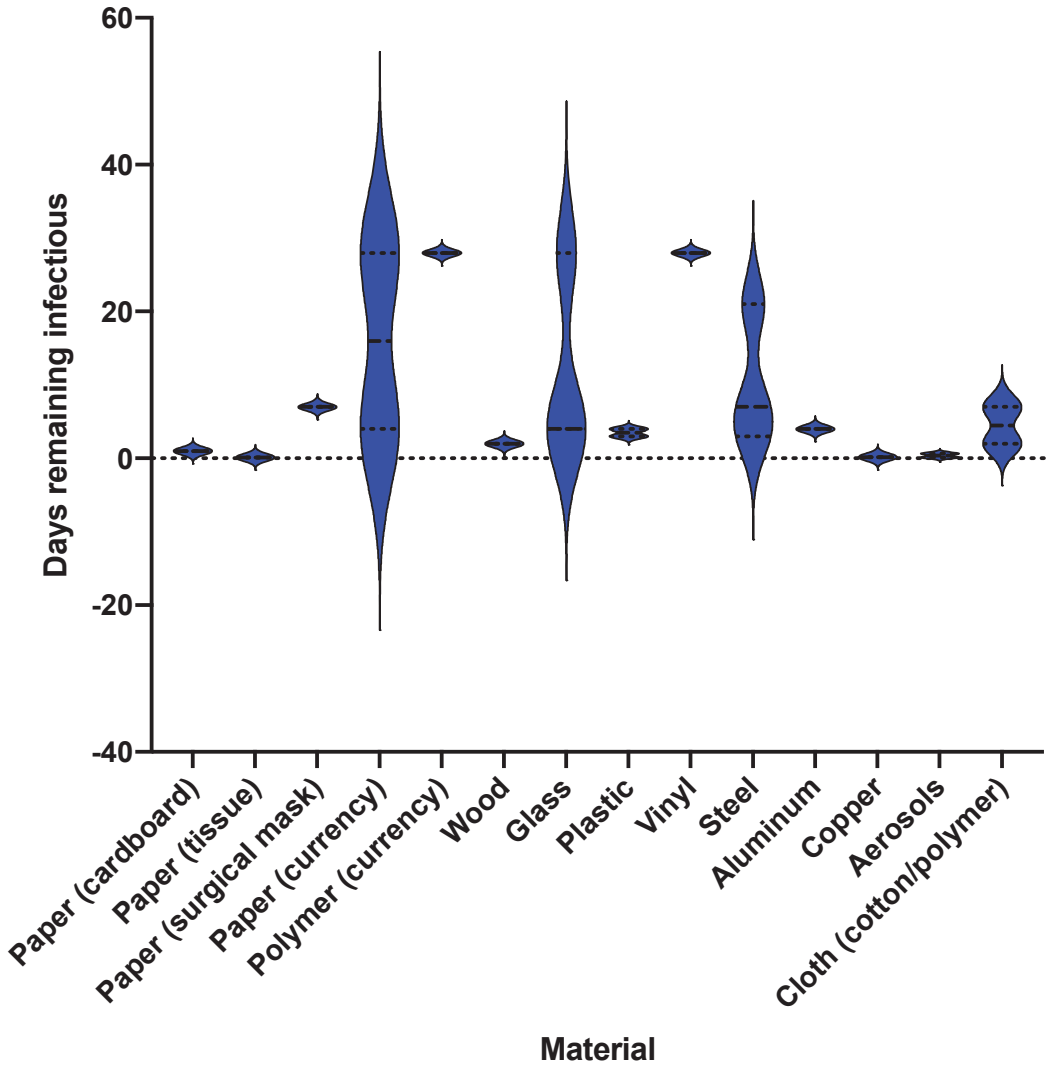


Figure 2. Persistence of Infectious Virus on Materials in Laboratory Studies[9–12,37]



B. Curriculum vitae of Angela L. Rasmussen

CURRICULUM VITAE

Angela L. Rasmussen, Ph.D.

722 W. 168th St
17th floor
New York, NY 10032
Office: (212) 305-8178
Mobile: (206) 605-3180
Twitter: @angie_rasmussen
angelarasmussen.org
angierasmussen@gmail.com
alr2105@columbia.edu

2240 Franklin Ave E
Seattle, WA 98102

Education

University of Washington, Seattle, WA 2009-2012
Department of Microbiology
Postdoctoral Fellowship

Columbia University Graduate School of Arts & Sciences, Coordinated Doctoral Program in Biomedical Sciences, New York, NY 2003-2009
Department of Microbiology
Ph.D, Microbiology, 2009
M.Phil., Microbiology, 2006
M.A., Microbiology, 2005

Smith College, Northampton, MA 1996-2000
B.A., Biological Sciences

Awards, Honors, and Invited Lectures

Invited speaker/honoree, Department of Biological Sciences, Smith College	2020
Invited panelist, ASM Virtual Journal Club	2020
Invited speaker, NYC Health System Special Pathogens	2020
Invited speaker, Memorial Sloan Kettering Grand Rounds: Advanced Topics in Infectious Disease	2020
Elemental 50 Experts to Follow in a Pandemic	2020
Invited speaker, MJH Life Sciences, COVID-19 Fact or Fiction?	2020
Invited speaker, MJH Life Sciences, Battling Dual Threats: Flu and COVID-19	2020
Member, MJH Life Sciences COVID-19 Coalition	2020
Invited speaker, MJH Life Sciences, COVID-19: Race for a Vaccine	2020
Invited speaker, COVID-19 Lessons Learned and Best Practices Dialogue, DTRA and the Republic of Philippines Department of Health	2020
Invited panelist, Pandemic Preparedness: A Roadmap for Future Outbreaks,	2020

Center for Global Development
Invited speaker, Breaking Science Writing, Johns Hopkins University 2020
Invited speaker, COVID-19 Seminar Series, HHMI Janelia 2020
Invited speaker, Coronavirus Preparedness Summit 2020
Invited speaker, Host Responses to Viral Pathogens, UC-Riverside 2020
Calderone Junior Faculty Prize, Columbia Mailman School of Public Health 2019
Invited speaker, Hot Topics in Emerging Pathogens, New York University 2018
Invited speaker, Institute of Systems Genetics, New York University 2016
Invited speaker, Mini-Medical School, University of Washington 2016
Invited speaker/honoree, Department of Biological Sciences, Smith College 2012
Invited speaker, Faculty of Veterinary Medicine, Udayana University, Denpasar, Bali, Indonesia 2012
Elected to Sigma Xi 2000
Margaret Wemble Brigham Award for Excellence in Microbiology or Immunology Research, Smith College 2000
Blakeslee Fellowship, Smith College 1999
Elizabeth Drew Memorial Prize for best short fiction, Smith College 1997

Please see angelarasmussen.org for a full record of press clippings and non-scientific writing

Experience

Associate Research Scientist (Junior Faculty) 2016-present
Center for Infection and Immunity, Mailman School of Public Health, Columbia University, New York, NY

- *Principal Investigator on a FastGrant award to use transcriptomics and machine learning approaches to study host responses to SARS-CoV-2 infection in rhesus macaques. We also used classification approaches combined with functional analysis to predict infection and identify host-directed drugs with potential as antiviral therapeutics.*
- *Lead scientist and project manager for a project grant within the Center for Research on Discovery and Diagnostics (CRDD), a U19 Center of Excellence for Translational Research. This project employs systems biology approaches to develop host response signatures with diagnostic or prognostic value.*
- *Principal Investigator on a cooperative agreement with the Defense Advanced Research Projects Agency (DARPA) to investigate host responses associated with tolerance to infection with Ebola virus and MERS-CoV*
- *Lead scientist on contracts with the Defense Threat Reduction Agency (DTRA), and the National Biodefense and Countermeasures Center (NBACC) in the Department of Homeland Security (DHS), investigating the host transcriptional response to infection with multiple emerging pathogens with significant relevance to biodefense (Ebola and Burkholderia pseudomallei).*
- *Directly supervise a veterinarian-scientist performing all high-containment work on BSL-4 pathogens as a special volunteer at the Rocky Mountain Laboratories Integrated Research Facility*
- *Directly supervise technicians and bioinformaticians*
- *Write grants, establish collaborations, and obtain support for an independent research program.*

- *Coordinate with international team of investigators to transfer samples, manage personnel, write grant proposals, and publish manuscripts.*
- *Drive scientific studies with integral roles in project conceptualization, experimental design, data collection and analysis, and authorship of original research manuscripts. These studies use a systems biology-based approach and analysis on zoonotic viral pathogens, primarily those that cause hemorrhagic fever (Ebola virus, Marburg virus, Lassa virus, Lujo virus, Hantaan virus), respiratory disease (influenza, MERS-CoV), and emerging arboviruses (dengue virus, SFTSV, Heartland virus, Powassan virus, Rift Valley fever virus).*

Research Assistant Professor 2014- 2016
Department of Microbiology, University of Washington, Seattle, WA
Katze Laboratory

- *Lead scientist and project manager on three U19 program projects totaling $7.2 million in direct costs. Also responsible for reporting, personnel management, resource allocation, and funding renewal of these programs.*
- *Write grants and establish collaborations.*
- *Coordinate with international team of investigators to transfer samples, manage personnel, write grant proposals, and publish manuscripts.*
- *Responsible for all efforts involving emerging or highly pathogenic viruses, specializing in highly pathogenic emerging viruses.*
- *Drive scientific studies with integral roles in project conceptualization, experimental design, data collection and analysis, and authorship of original research manuscripts. These studies focused on emerging pathogens including filoviruses, MERS-CoV, dengue virus, H7N9 influenza virus, bunyaviruses, and arenaviruses.*
- *Guest lecturer during spring quarter graduate-level virology lecture courses.*
- *Mentor postdoctoral fellows and junior scientists in the laboratory.*

Scientific Project Manager 2012-2014
Department of Microbiology, University of Washington, Seattle, WA
Katze Laboratory

- *Management of Katze lab efforts contributing to three large, multi-institutional research grants (PNWRCE, CETR, Systems ImmunoGenetics), including personnel, resources, scientific contributions, programmatic reporting, compliance, and funding renewal.*
- *Coordination with other researchers worldwide for sample procurement, data acquisition, and analysis.*

Senior (Postdoctoral) Fellow 2009-2012
Department of Microbiology, University of Washington, Seattle, WA
Katze Laboratory
Principal Investigator: Professor Michael G. Katze, Ph.D.

- *Systems biology-based analysis of infection and pathogenesis of hepatitis C virus in both human liver transplant recipients and experimental models of HCV replication.*
- *Use of both systems approaches (transcriptomics, proteomics, metabolomics) and traditional molecular, biochemical, cellular, and virologic techniques.*

Graduate Research Associate 2003-2009
Department of Microbiology, Columbia University, New York, NY
Principal Investigator: Professor Vincent R. Racaniello, Ph.D.
Dissertation: “Development of a mouse model of rhinovirus infection.”

- *Development of a mouse model of rhinovirus infection by isolating and characterizing host range variants capable of enhanced replication in mouse cells.*
- *Maintained Racaniello laboratory mouse colony.*

Graduate Technology Fellow 2006-2008
Columbia Technology Ventures
- *Performed numerous analyses to support intellectual property and technology transfer at Columbia University, including evaluating inventions for commercial viability, patent searches, scientific literature searches, and identification of potential licensees.*

Research Associate 2000-2003
Xcyte Therapies, Inc., Seattle, WA
- *Developed T-cell expansion technologies for large-scale lymphocyte cultivation in the context of samples collected from patients with hematological malignancies*
- *Performed a variety of functional and characterization studies to support preclinical development of T-cell immunotherapies for renal cell carcinoma, prostate cancer, B-cell chronic lymphocytic leukemia, non-Hodgkin's lymphoma, and multiple myeloma.*

Blakeslee Fellow/Student Researcher 1998-1999
Smith College, Northampton, MA
Principal Investigator: Professor Christine A. White-Ziegler, Ph.D.
Areas of Concentration: Microbiology, Microbial Genetics
Special Studies Project: "Mutational Analysis of rimJ"
- *Mutational analysis of rimJ, a gene involved in transcriptional thermoregulation of Escherichia coli Pap fimbrial gene expression.*

Intern 1998
XOMA (US) LLC, Berkeley, CA
- *Comparison of rBPI$_{21}$, a recombinant antibacterial peptide, to Polymyxin B as inhibitors of lipopolysaccharide-mediated proinflammatory cytokine secretion*

Academic Service
Member, Editorial Board, *mSphere*, 2020-present
Guest Editor, "Host Factors in Viral Infection," *Viruses*, 2020-present
Member, Editorial Advisory Board, *Cell Reports*, 2020-present
Member, WHO Ad Hoc Expert Group on Preclinical Models of COVID-19 Disease. February 2020-present.
Reviewer, Tick Borne Disease Panel, FY20 Peer Review Tick Borne Disease Research Program (TBDRP), CDMRP, August 2020-October 2020.
Reviewer, Viral Infectious Disease Panel, FY20 Peer Review Medical Research Program (PRMRP) Discovery Award, CDMRP, May 2020-July 2020.
Reviewer, Fondazione Cariplo, Call to support the development of collaborations for the identification of therapies, diagnostic tools, protective equipment and analysis systems to help fight the Coronavirus emergency and other potential future viral emergencies, April-May 2020.
Reviewer, Flavivirus RA-S-IN Panel, FY20 Military Infectious Diseases Research Program (MIDRP), intramural research program study section, December 2019-January 2020.

Steering Committee, Public Health 2035: Developing a Bold Vision for Our Second Century, Columbia Mailman School of Public Health, October 2019-present

Reviewer, Emerging Infectious Diseases Panel, Congressionally Directed Medical Research Programs (CDMRP), FY20 Peer Review Medical Research Program (PRMRP) Focused Program Award, July-September 2019.

Member, NIH Advisory Committee to the Director Working Group on Changing the Culture to End Sexual Harassment, 2019-present.

Reviewer, National Aeronautics and Space Administration (NASA), HERO Inflammation-Immunology study section, 2018.

Reviewer, National Aeronautics and Space Administration (NASA), Space Biology study section, 2018.

Topic editor, "Host-pathogen interactions during arboviral infections," *Frontiers in Cellular Infection and Microbiology.* 2018-2019.

Guest editor, "Host Responses to Viral Infection," *Vaccines*. 2017.

Member, Institutional Biosafety Committee, University of Washington, November 2014-March 2016.

Reviewer, Pre-Dengue Panel, Congressionally Directed Medical Research Programs (CDMRP), FY15 Peer Review Medical Research Program (PRMRP), July 2015.

Reviewer, Lethal Virus Countermeasures Panel, US Army Medical Research and Materiel Command, FY16 Military Infectious Diseases Research Program (MIDRP), Joint Program Committee-2, intramural research program study section, March 2015.

Panelist, NIH Pathways to Prevention (P2P): Advancing the Research on Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS), 2014.

Reviewer, National Aeronautics and Space Administration (NASA), Space Biology study section, 2014.

Publications

M. Aminian, T. Ghosh, A. Peterson, **A.L. Rasmussen**, S. Stiverson, K. Sharma, and M. Kirby. ***Early prognosis of respiratory virus shedding in humans***. *Scientific Reports*, under review.

K. Escandón, A.L. Rasmussen, I.I. Bogoch, E.J. Murray, and K. Escandón. ***COVID-19 and false dichotomies: time to change the black-or-white messaging about health, economy, SARS-CoV-2 transmission, and masks***. *Travel Medicine and Infectious Disease,* under review.

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Manuscripts in Preparation

A. Price, P. Sharma, N. van Doremalen, A. Okumura, V.J. Munster, E. de Wit, and **A.L. Rasmussen**. *Host response signatures linked to SARS-CoV-2 pathogenesis in rhesus macaques*. Expected submission: November 2020

N. van Doremalen, A. Price, N. Bhanu, R. Wu, P. Sharma, A. Okumura, M. Artami, B.A. Garcia, V.J. Munster, and **A.L. Rasmussen**. ***Integrated host response profiles define severity in a mouse model of MERS coronavirus.*** Expected submission: December 2020.

A. Price, R.W. Cross, P. Sharma, C.B. Woolsey, K.N. Agans, B. Lee, J. Garcia, A. Oleynik, A. Gokden, M. Artami, W.I. Lipkin, T.W. Geisbert, and **A.L. Rasmussen**. ***Differential Ebola virus disease severity after conjunctival exposure.*** Expected submission: January 2021.

O.M. Allicock, E. Haddock, A. Okumura, A. Price, F. Feldmann, D.W. Hawman, H. Feldmann, and **A.L. Rasmussen**. ***Host responses distinguishing outcome in a cynomolgus macaque model of Crimean-Congo hemorrhagic fever.*** Expected submission: February 2021.

A. Okumura, P. Sharma, N. Bhanu, R. Wu, E. Haddock, F. Feldmann, K. Meade-White, M. Artami, D.W. Threadgill, H. Feldmann, B.A. Garcia, and A.L. Rasmussen. ***Proteomic and metabolomic signatures of tolerance to Ebola virus infection.*** Expected submission: February 2021.

Research Funding

CURRENT

FastGrants (Rasmussen)
Longitudinal study of COVID-19 progression in non-human primate models
$50,000
The goal of this project is to identify the biological basis for COVID-19 progression in a rhesus macaque model of SARS-CoV-2 pathogenesis.

Role: PI

PENDING
NSF BII (Carlson)
VERENA: Viral Emergence Research Initiative
$200,000
This award supports the development of the VERENA consortium as a research institute, with the institute application projected for submission in 2021.
Role: Co-PI, virology team leader

NIH/NIAID R01 (Rasmussen)
Sex-specific host responses in Ebola virus pathogenesis
$2,198,322
The goal of this project is to use the Collaborative Cross model of Ebola virus disease to study the genetic basis for sex biases in disease severity and define the role of sex hormones in pathogenesis.
Role: PI

Canadian Institute of Health Research (Kindrachuk/University of Manitoba)
Mechanisms of asymptomatic Ebola virus testicular infections
The goal of this project is to characterize the basis for testicular persistence of Ebola virus infection and elucidate mechanisms of male-to-female sexual transmission.
Role: Subaward

C. List of Documents Considered

Affiliated FM Policy No. GS784, Issued March 20, 2019
List of Nevada Governor and Public Health orders related to COVID-19 issued in 2020
Data regarding COVID-19 cases at Treasure Island

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